ADDENDUM
To the Draft and Final Environmental Impact Statements for the Washington State Department of Natural Resources Trust Lands Habitat Conservation Plan

SEPA File No. 94-042501

Description of the original proposal: Final Habitat Conservation Plan (HCP) for Washington Department of Natural Resources (DNR), dated September 1997, enabled DNR to receive an Incidental Take Permit under the federal Endangered Species Act (ESA). The HCP provides conservation measures for northern spotted owls and marbled murrelets, as well as other listed and unlisted species, particularly the several species of anadromous salmonids, on 1.45 million acres of forested state trust lands located in the Westside HCP planning units (excluding the Olympic Experimental State Forest) within the range of the northern spotted owl.

Description of the addendum: The original HCP document, agreed to by the U.S. Fish and Wildlife Service (USFWS) and NOAA Fisheries Service, (the Federal Services), stated that implementation procedures for making site-specific forest management decisions concerning restoration in riparian management zones (RMZs) and wind buffers would be developed in the future by the DNR. This Addendum describes those Implementation Procedures for the Habitat Conservation Plan Riparian Forest Restoration Strategy (RFRS). Adjustments will be made to the DNR Forestry Handbook to incorporate these new procedures. A copy of the new Forestry Handbook procedure PR 14-004-150 *Implementation Procedures For The Habitat Conservation Plan Riparian Forest Restoration Strategy* is attached (Attachment B). Implementation of this new Forestry Handbook procedure will take place immediately.

These procedures clarify the HCP riparian conservation strategy and give direction to field staff that address: 1) Riparian management zones and the riparian conservation strategy, including typing of streams, delineation of RMZs for restoration, and site-specific management; 2) Precommercial and commercial silviculture prescriptions and treatments; 3) Documentation of silvicultural activities; 4) Operational guidance for riparian silvicultural activities, including roads, yarding, salvage, legacy trees, and wetlands management; and 5) Monitoring RMZ restoration, including silvicultural practice effectiveness monitoring, instream conditions and trends monitoring and adaptive management. This Addendum supplements information in the Draft EIS and Final EIS for the HCP. Specifically, the Addendum documents slight adjustments to the HCP's vision of harvest and management guidance within riparian management zones. This Addendum describes the Implementation Procedures for the Habitat Conservation Plan Riparian Forest Restoration Strategy, which are discussed further in Attachment A. Attachment B identifies the canceled Forestry Handbook Procedure PR 14-004-150 (Identifying and Protecting Riparian And Wetland Management Zones In The West-Side HCP Planning Units, Excluding The OESF Planning Unit (August 1999)). This former, interim Forestry Handbook procedure is superceded with PR 14-004-150 *Implementation*

Procedures For The Habitat Conservation Plan Riparian Forest Restoration Strategy which are the Implementation Procedures for the Habitat Conservation Plan Riparian Forest Restoration Strategy.

Finally, Attachment C contains documentation from the U.S. Fish and Wildlife Service and the National Oceanic and Atmospheric Administration Fisheries in response to comments from interested parties regarding the RFRS. In these documents, the Federal Services are in agreement with DNR, and have produced a letter of concurrence that states that the Implementation Procedures for the Riparian Forest Restoration Strategy fulfill the requirements outlined in the HCP. The Services also agree with the DNR that the RFRS provides the promised guidance for site-specific riparian guidance while not changing any existing HCP conservation strategies.

Description of existing environmental documents: The Draft Environmental Impact Statement for the HCP was published by DNR in March 1996, and the Final EIS for the HCP was published in October 1996. Since the Final EIS provided only edits to the Draft EIS, this Addendum references both documents. The Final HCP was published in September 1997.

Proponent: Washington State Department of Natural Resources, Land Management Division

Lead Agency: Washington State Department of Natural Resources

This Addendum is being distributed pursuant to WAC 197-11-600 and 197-11-625. It has been determined that the slight modifications to the Riparian Forest Restoration Strategy embodied by these Implementation Procedures do not substantially change the analysis of significant impacts in the Draft and Draft and Final EISs for the Department of Natural Resources Habitat Conservation Plan.

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There is no agency SEPA appeal.

Attachment A
Evaluation of Using an Addendum for the Implementation Procedures for the HCP's Riparian Forest Restoration Strategy

Introduction

The Washington Department of Natural Resources (DNR) entered a multi-species Habitat Conservation Plan (HCP) in 1997 to address state trust land management issues relating to compliance with the federal Endangered Species Act. The plan covers 1.6 million acres of state trust lands and allows timber harvesting and other activities to continue while providing for species conservation. The DNR HCP consists of four main conservation strategies covering the northern spotted owl, the marbled murrelet, other federally listed species, and the riparian ecosystem. The Riparian Conservation Strategy applies only to the Westside planning units. The Olympic Experimental State Forest (OESF) is excluded due to its emphasis on research and its climatic, geological, and physiographic characteristics of the western Olympic Peninsula. A Draft EIS was prepared for the HCP in March 1996, and edits to the Draft EIS appeared in a Final EIS in October 1996.

The HCP envisioned active forest management within the context of the Riparian Conservation Strategy, expressed in implementation procedures, to address past impacts of forest management practices in riparian areas. Current conditions of riparian vegetation on state and private lands in western Washington are a result of unregulated harvests that occurred prior to the first riparian protection rules adopted in 1982. Most riparian forests have been logged at least once. Due to decades of unregulated harvests and only incremental adoptions of riparian forest harvest regulations over the last 25 years, long-term changes to the riparian habitat structure have taken place, mainly resulting in a simplification in plant community structure and composition (FEIS 2001). The FEIS on Alternatives for Forest Practice Rules for Aquatic and Riparian Resources estimates that approximately 78 percent of west side stream miles flow through early seral stage riparian areas that contain "vegetation that cannot provide a properly functioning riparian system important to aquatic and terrestrial biota" (FEIS 2001 3-42). The early seral stage represents forests that are less than 40 years old and contain small-diameter conifer and hardwood trees (Appendix C FEIS 2001). Past management often either left riparian areas in crowded conditions of planted second-growth timber, or extensive human disturbance resulted in increased levels of hardwoods, particularly red alder. The loss of function as a result of these conditions is discussed in more detail in DNR's Habitat Conservation Plan at IV-77 to IV-78. The HCP DEIS concludes "existing riparian areas are in need of enhancement if they are to be returned to productive condition in the relatively near future" (DEIS 4-139).

The HCP indicated that the DNR would prepare implementation procedures to guide site-specific forest management decisions in riparian management zones on DNR-managed lands. See HCP at IV-59 to IV-62. This Addendum describes the implementation procedures for riparian forest management.

The Riparian Conservation Strategy consists of two main objectives:

(1) to maintain or restore salmonid freshwater habitat on DNR-managed lands, and
(2) to contribute to the conservation of other aquatic and riparian obligate species (WA DNR 1997, IV. 55).

The strategy envisions that maintaining or restoring the ecosystem processes that determine salmonid habitat quality have the highest priority, while the conservation of other aquatic and riparian obligate species would occur indirectly. Since upland processes have the potential to negatively affect salmonid habitat, minimizing potential adverse impacts from upland management activities is also an integral part of the Riparian Conservation Strategy. As a consequence, five conservation components were identified in the HCP's Riparian Conservation Strategy to meet the two riparian conservation objectives:

1) Riparian Management Zones
2) Unstable Hillslopes and Mass Wasting
3) DNR's Road Management Strategy
4) Hydrologic Maturity in the Rain-on-Snow Zone
5) Wetlands Protection

Together, the guidelines for these five components provide "a combination of conservation measures that are expected to minimize and mitigate the impacts of take of the anadromous fish species addressed in the HCP" (NOAA 1999).

The establishment of Riparian Management Zones (RMZs) along type 1-4 stream types is the key conservation component, as its primary function is the protection of salmonid habitat. The HCP envisioned that "harvesting can occur within RMZ buffers as long as management activities support these principal functions and are consistent with the conservation objectives" (WA DNR 1997, IV. 56). At the time of the signing of the HCP, a general description of management activities that are allowable in RMZs was provided and a general vision was drawn for how big and how old trees would be by the end of the 21st century (WA DNR 1997, IV. 60). Since forest management activities in RMZs will need to be site-specific and since it was anticipated that the intensity of management from site to site would vary, the HCP stipulated that DNR would develop methods for making site specific forest management decisions, which would be described in implementation procedures reviewed by the federal services (US Fish and Wildlife Service and NOAA Fisheries). The implementation procedures describe the conservation objectives in detail, define terminology, activities and prescriptions, detail the monitoring methods and describe the training to be provided to agency staff.

This Addendum clarifies where DNR's implementation procedures for the HCP's Riparian Forest Restoration Strategy (RFRS) provide significantly more detail than the HCP or diverge from the HCP's original outline for riparian management activities. Furthermore, the Addendum discusses the impacts associated with these differences and explains why the impacts are within the range of impacts discussed in the HCP's DEIS and FEIS.

Background

When the HCP was signed in 1997, it was assumed that the implementation procedures would be developed within one year. However, for various reasons including staffing, budget and other implementation priorities, it took DNR seven years and several efforts to develop the implementation procedures. Although the HCP contains a “fallback” strategy guiding timber harvest in RMZs prior to agreement on the proposed agency procedures, DNR took a very conservative approach and elected not to harvest any timber over the last seven years from RMZs, except for research and monitoring in the OESF. The information gained from these early experiments has been very useful in developing the RFRS and served as a valuable outreach tool to communicate with stakeholders.

DNR launched its first effort to create the implementation procedures in 1999 with the formation of a Scientific Committee, which developed recommendations for Riparian Management Procedures. The Committee included representatives from DNR, Washington Department of Fish and Wildlife (WDFW), Washington Environmental Council (WEC), tribes, universities and the federal services. The procedures stalled, however, due to required assessments, field procedures, and contributions of large down wood beyond feasible implementation levels. Nevertheless, the Scientific Committee’s recommendations provided a valuable foundation for all following draft procedures, including the current RFRS implementation procedures.

Development of the current RFRS started in earnest in December of 2003 with a core group of DNR scientists. After a first draft was developed, a Technical Review Committee was formed to review and guide the further development of the implementation procedures. The Technical Review Committee consisted of Matthew Longenbaugh (NOAA Fisheries, Fish Biologist), Mark Ostwald (U.S. Fish and Wildlife Service, Wildlife Biologist), Steve McConnell (NW Indian Fisheries Commission, Silviculturist), and Paula Swedeen (WA Department of Fish and Wildlife, Wildlife Biologist). With input from the Technical Review Committee and their respective agencies, and input from three public meetings held in Olympia, Port Angeles, and Mt. Vernon in the spring of 2004, the RFRS was further refined. A draft RFRS was made available to DNR employees and stakeholders including tribal biologists, the Washington Environmental Council, and the Olympic Coast Alliance in the fall of 2004. These comments, additional reviews during the spring of 2005, additional stakeholder meetings, and field trips with stakeholders along with the Technical Review Committee helped shape the final RFRS. By relying on the core work of the Science Committee from 1999 and new information from more recent research, coupled with a very inclusive and transparent stakeholder input process, DNR feels that it has developed a feasible approach to implementing the riparian restoration objectives of RMZs outlined in the HCP relying on the best scientific information currently available.

The Restoration Goal in Riparian Management Zones (RMZs)

The HCP specifies that the purpose of the RMZ is to maintain or restore the ecological functions in riparian and upland areas that directly influence salmonid freshwater habitat (WA DNR 1997, IV. 70). The principal functions of riparian ecosystem processes that influence the quality of salmonid freshwater habitat are water temperature, stream bank integrity, detrital nutrient load, and the delivery of large wood. Historic logging practices are one of the main causes why riparian areas on state trust lands are currently impaired in providing the full range of functions. Channels were simplified through landslides and splash damming, fish passage was inadvertently blocked, and trees providing shade, stream bank stability and large instream wood were removed through extensive logging (NMFS 1997).

The RFRS translated the ecological functions maintaining or restoring salmonid habitat quality into forest components that would support the required functions. "The three characteristics most needed for riparian function are large conifer trees, a complex stand structure, and species composition that includes long-lived tree species that provide stability to streambanks, channels and floodplains" (WA DNR 2005 page 8). While the HCP and EIS do not specify exact criteria for stand structure or forest composition, these three characteristics are integral aspects of ecologically healthy RMZs and the intent to maximize these features in RMZ restoration is implied in various statements. The HCP, for example, describes the restoration goal as a "more natural mix of hardwood and conifer species and to enhance the development of old conifer forests" (WA DNR 1997, IV. 74). This also implies, as pointed out in the RFRS, that instream conditions –the quality of salmonid habitat- are linked to the riparian forest condition and that riparian forests exhibiting late successional characteristics generally provide better salmonid habitat than stands in early development stages (HCP IV-71).

The HCP did not specify precisely what the final goal of RMZ restoration would be, or how it would be measured or recognized once it was achieved. The RFRS, expanding upon the components needed to provide the ecosystem processes for quality salmonid habitat, describes the riparian restoration goal as: **"***The long-term goal for riparian forests managed under the HCP is a structurally complex riparian forest. The structurally complex riparian forest is assumed to be equivalent to […] the "Fully Functional" development stage. This old growth-like forest condition may require 200 to 400 years to develop. Structurally complex riparian forest conditions are characterized by an overstory dominated by very large diameter trees, high leaf areas characteristic of multistoried stands, high rates of productivity resulting in large amounts of fine and coarse woody debris, and a well developed understory. It is assumed that these forests will best support all riparian ecosystem functions required for salmon habitat recovery."* (WA DNR 2005 page 12).

The Fully Functional forest development stage (Table 1) is consistent with the language found in the HCP and reflects the intent of the riparian conservation objectives, which are described as developing forests with "old-growth characteristics, i.e., large old trees, multilayered canopy, and numerous snags and logs" (WA DNR 1997, IV. 78). The HCP specifically states, that improvement of salmonid habitat on DNR-managed lands will occur as “forests within riparian ecosystems develop into older conifer forests” (WA DNR 1997, IV. 77).

The HCP indicates that riparian restoration should not be used when the quality of salmonid habitat would not be maintained or restored. However, the HCP does not provide specific guidance regarding when riparian restoration strategies should be employed. For practicality, managers need measurable targets to assess opportunities and progress toward the long-term management objective of the Fully Functional forest development stage, particularly because it may take 200 to 400 years to develop fully functional forest characteristics. The riparian desired future condition (RDFC) as outlined in the RFRS provides that objective (WA DNR 2005, page 13). Active forest management will put riparian forests on a trajectory towards the Fully Functional development stage, and active management will cease when the riparian desired future condition has been reached. This desired condition will result in forests that resemble the Developed Understory to Niche Diversification stages (Table 1). Some elements of Fully Functional forest characteristics will start to emerge in forests in this condition, but not all the elements of a structurally complex forest will be present. Specific target values describing the composition and size of trees, snags and down wood, and the diameter distribution of the stand are specified for attaining the riparian desired future condition (WA DNR 2005, page 14). Once these parameter values are attained, passive management will eventually lead to a diverse range of forest conditions meeting the Fully Functional development stage. This approach is expected to dramatically increase the amount of old growth and the number of stands containing large conifers over time as anticipated in the HCP (see graph in WA DNR 1997, IV. 60) and greatly reduce the potential for implementing forest management activities that fail to restore or maintain salmonid habitat.

Table 1: Summary of the stand development stages. Based on the Washington Forest Landscape Management Project by Carey et al. (1996). See Final EIS on alternatives for Sustainable Forest Management of State Trust Lands in Western Washington, at Appendix B-47 to B-52, for further explanation and photographic examples.

Stand Development Stage	Description
Ecosystem Initiation	Establishment of a new forest ecosystem following death or removal of overstory trees by wildfire, windstorm, insects, disease, or timber harvesting. Varying rates of retention of biological legacies (e.g., understory trees, large snags and down wood, soil microbes and invertebrates, fungi and non-vascular plants, etc.) influence the rate at which the stand develops into a Fully Functional forest in the future.
Sapling Exclusion	Trees fully occupy the site (canopy cover exceeds 70 percent) and start to compete with one another for light, water, nutrients, and space. Most other vegetation is precluded and many trees become suppressed and die.
Pole Exclusion	The high density and uniform size of relatively short trees creates dark understory conditions and low levels of biological diversity. Suppression mortality of smaller trees leads to the creation of small snags.
Large Tree Exclusion	Continued suppression mortality reduces tree density and creates small openings where scattered pockets of ground vegetation become established. Small snags created during the Pole Exclusion stage fall, creating small down logs.
Understory Reinitiation	Achievement of dominance by some trees (and death of others) leads to the development of canopy gaps where understory plants become established. Stands that arrive at this condition through natural development typically have greater than 70 percent canopy coverage overall; thinning produces stands with 10-70 percent canopy cover.
Developed Understory	Understory of herbs, ferns, shrubs, and trees develops after death or removal of some dominant trees; time has been insufficient for full diversification of the plant community.
Botanically Diverse	Organization and structure of the living plant community becomes complex with time, but lack of coarse woody debris and other biological legacies precludes a full, complex biotic community.
Niche Diversification	The biotic community becomes complex as coarse woody debris, cavity trees, litter, soil organic matter, and biological diversity increase; diverse trophic pathways develop; wildlife foraging needs are met.
Fully Functional	Additional development provides habitat elements of large size and interactions that provide for the life requirements of diverse vertebrates, invertebrates, fungi, and plants.
Old Natural Forests	Structural characteristics are the same as those of Fully Functional forest, but age (greater than 250 years), natural origin, and lack of management history may contribute attributes and organisms that do not exist in younger stands that developed through other processes (e.g., silvicultural management).

The HCP identifies active management as a means to achieve the conservation objectives and emphasizes acceleration of forest succession through stand development stages either through hardwood removal or conifer thinning as key to successful restoration (WA DNR 1997, IV. 74). The RFRS develops this approach in more detail by identifying the development stages that are in greatest need for riparian restoration because they are successionally stalled in the competitive exclusion stages (Sapling, Pole, and Large Tree Exclusion stages) or because they lack an adequate number of conifers to develop into a natural mix of hardwood and very large diameter conifer trees (Table 2). These predominant development stages lack the very large trees and multiple canopy layers found in later stages of stand development, and are usually deficient of large snags and significant amounts of down wood. Within competitive exclusion developmental stages, understory vegetation is generally severely depressed. If these closed canopy stands do not receive riparian restoration efforts, they are likely to remain at an incomplete level of ecological function for many decades due to slow rates of natural self-thinning and disturbance (WA DNR 2005, page 9). Chan et al. (2004 b) described these stands as typically remaining in the “stem exclusion stage, lacking structural and biological diversity for extended periods of time. Lack of complexity makes these young stands poorly suited for supporting many riparian-dependent species, the northern spotted owl, and many other wildlife species”. Active management as described in the HCP and RFRS, such as forest thinning, is expected to advance the stand development stages toward the Fully Functional forest, and therefore achieve the restoration of salmonid and riparian-obligate species’ habitat more quickly than without management.

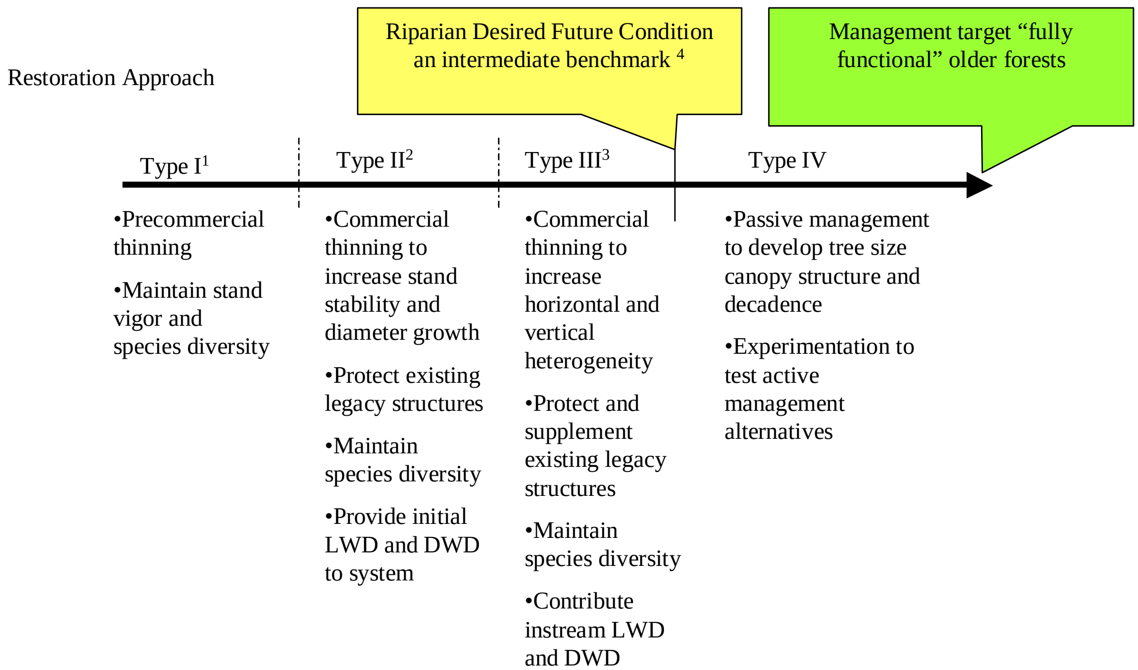
Table 2: Summarized Stand Development Stages

Less Complex Forest

Summarized Stand Development Stage	**Stand Development Stage**
Ecosystem Initiation	Ecosystem Initiation
Competitive Exclusion	Sapling Exclusion
	Pole Exclusion
	Large Tree Exclusion
	Understory Reinitiation
Structurally Complex	Developed Understory
	Botanically Diverse
	Niche Diversification
	Fully Functional/ Old Natural Forests

More Complex Forest

In summary, the implementation procedures define the long-term goal for riparian forest restoration as a structural complex forest (Fully Functional) that may take 200 to 400 years to develop. The implementation procedures also adopt a classification system of forest development as a tool to track progress towards the goal. The goal, based on language found in the HCP, is consistent with the objectives of the Riparian Conservation Strategy. By providing a shorter-term benchmark –the riparian desired future condition (RDFC)– to measure restoration progress and to determine when restoration becomes unsuitable, and by identifying particular development stages as targets for restoration efforts, the RFRS takes a conservative approach. Active management is only used to put riparian forests on the trajectory towards the long-term goal. Passive management will take over after that point, and will ultimately lead to the diversity in composition and structure envisioned in the HCP for “older forest conditions”. Figure 1 represents a graphical illustration of the proposed combination of active and passive management to reach the Fully Functional forest development stage. Improved salmon habitat on DNR-managed lands will be a result of accelerating the development of riparian forests towards older conifer forests.



[1] Stands with no or little existing structure in Sapling exclusion

[2] Stands with little existing structure in Pole exclusion

[3] Stands with some existing structure in Large tree exclusion and Understory Reinitiation

[4] Commercial thinning will cease before reaching the RDFC as restoration treatments have to accelerate the development towards the RDFC targets.

Figure 1: The path to the Fully Functional forest development stage through active management (thinning) to the RDFC and passive management thereafter.

Riparian Management and Prioritization

The RFRS anticipates that most riparian management entries will be conducted coincident with adjacent upland management entries, such as pre-commercial thinning, commercial thinning, individual tree selection, group selection, patch cutting or final harvest (WA DNR 2005, page 20). This synchronized approach between upland and riparian management ensures that upland areas are not disturbed on multiple occasions, that restoration can take place in otherwise infeasible situations, and allows more operational flexibility. Furthermore, in some areas, the DNR cannot economically accomplish RFRS objectives unless forest management activities also occur on adjacent uplands. The HCP or EIS provide no guidance on how riparian restoration would fit into the overall management plan of DNR trust lands. Since upland management activities are spatially and temporarily dispersed across the landscape, using a synchronized approach will lead to less potential adverse impacts to salmonid habitat and riparian obligate species as only small portions of a stream reach (several hundred to a few thousand stream-adjacent feet) will receive restoration treatments at one time, compared to the potential impacts of extensive restoration treatments along greater stream reaches if they were implemented without upland management activities.

There is some concern that combining upland and riparian activities may lead to local increases in sediment delivery compared to riparian or upland-only management. The DEIS (1996) points out that the ability of streamside buffers to capture sediments is largely dependent on the width of the buffers and that the contribution of sediment per unit area from roads is often greater than that from all land management activities combined (DEIS 4-163). The HCP addresses the most significant impacts in regards to sediment delivery by minimum RMZ width designations (at least 100 feet for all type 1-4 streams), a comprehensive road management plan, and hydrologic maturity in the rain-on-snow zone.

A synchronized approach is expected to lead to improved operational efficiencies that will reduce the potential of sediment delivery, especially from roads, the primary source point for pollution in forest landscapes. In most instances, fewer roads will need to be built and/or roads can be abandoned more quickly. If restoration were to focus only on riparian areas, more roads and roads closer to stream channels would have to be constructed in most cases, greatly increasing the potential for sediment delivery. More extensive riparian-only treatments are likely to impact riparian obligate species more adversely as larger areas are treated at one time and their ability to move to undisturbed sites would be reduced. Finally, riparian-only treatments may not be economically viable in many cases delaying or preventing habitat restoration. Nevertheless, the RFRS contains several provisions to mitigate an increased potential for sediment delivery in addition to the provisions made in the HCP. The 25-foot no-harvest inner zone combined with an additional 25-foot equipment “no entry” zone will leave a 50-foot buffer of undisturbed vegetation with a great potential to intercept sediment from surface erosion. A requirement to apply water bars on all skid trails in the RMZ will further reduce the potential of surface erosion.

As pointed out, the HCP does not indicate when the restoration of salmonid habitat would be achieved. Therefore, little guidance can be found to indicate how much management is appropriate in RMZs. The HCP states, that “forest management within RMZs will be site specific” and that “the intensity of management will vary” because of variation in site conditions (WA DNR 1997, IV. 60). The RFRS points out that “most riparian stands can be significantly advanced towards the riparian desired future condition with only one or two management entries” (WA DNR 2005, page 20). The decision on how many entries are appropriate is based on the development stage of the riparian forest, and therefore varies from site to site. This decision is consistent with the HCP. It is unclear whether the “intensity” refers to individual management activities or a series of activities over time but most likely it refers to both. The Incidental Take Permit (NOAA 1999) anticipated that selective harvest would occur only once per timber harvest rotation, e.g., 60 to 140 years. The RFRS, with the long-term goal of a structural complex riparian forest that will take 200 to 400 years to develop, proposes one or two commercial management entries. As a result, the amount of management over time will be similar but the RFRS envisions the possibility of more intensive intervention (i.e. two management entries 20 to 25 years apart) for forests in early stand development stages, where appropriate. Stands in early development stages respond extremely well to silvicultural treatments. To maintain riparian functions adequately in the short-term, two light to moderate intensive treatments two to three decades apart are expected to better meet the long-term goal. Although one heavy treatment might even further accelerate stand development towards older forest conditions, riparian functions would likely be impacted significantly in the short-term. The RFRS balances, as pointed out in more detail later on, the goal of accelerating riparian forests towards structurally complex older forests and maintaining adequate riparian functions in the short-term.

The HCP envisioned that thinning would "be used to accelerate the development of riparian stands in order to provide essential elements of salmon habitat as well as contribute to upland species habitat needs" (WA DNR 1997, IV. 208). However, the HCP also states, that "The most common restoration prescription might be the conversion of streamside hardwood or brush stands, typically created after original logging over the past decades, to conifer stands that can provide a source of large woody debris to the streams." (WA DNR 1997, IV. 208). The RFRS, as summarized in Appendix 4 of the RFRS (WA DNR 2005, page 51) and as shown in Table 3, places a different emphasis on forest conditions to be treated.

Table 3: Riparian Management Scenarios and their Prioritization

STAND CONDITION	Restoration Objective and Priority	Priority
Conifer Dominated Stands: **Type II RMZ Thinning in Conjunction with Upland Thinning**	Accelerate individual tree growth, vigor and stability. Promote species diversity with priority on retaining a component of shade tolerant tree species. Promote future heterogeneity in stand structure. Creation of dead down wood to enhance riparian habitat.	**Highest Priority**
Conifer Dominated Stands: **Type III RMZ Thinning in Conjunction with Upland Thinning**	Accelerate individual tree growth, vigor and stability. Promote species diversity, protect existing structural components. Promote heterogeneity in stand structure. In particular snags, down wood, remnant trees, and advance regeneration will be protected. Creation of dead down wood to enhance riparian habitat.	**Second Highest Priority**
Conifer Dominated Stands: **Type III RMZ Thinning in Conjunction with Upland Regeneration Harvest**	Same as above with the addition of protecting the stand from excessive windthrow.	**Medium Priority**
Hardwood Dominated stands: **Individual Conifer Release**	Release established conifers from hardwood competition. Protect any existing structures such as snags and DWD.	**Low Priority**
Hardwood Dominated Stands: **Conversion**	Create an older forest stand condition dominated by conifers by eliminating the current stand and establishing a mix of site-adapted conifer species.	**Low Priority**

As shown in the table, in stands determined to require management activities, conifer stand RMZ thinning will be prioritized over conversion of hardwood stands to conifer stands. Conversions are ranked relatively low as a restoration priority for ecological and operational reasons. Recent research (Wipfli 2001, Wipfli personal communication; Volk 2004) has shown the tremendous aquatic productivity of hardwood-dominated stream reaches and a mixture of hardwood and conifers along stream systems appears to be best in providing aquatic habitat. Large conifers provide physical habitat structures and hardwoods support a more productive food web of aquatic and terrestrial insects. Operationally and ecologically, conversions pose many challenges including highly compactable soils, intense competition for tree seedlings from other vegetation, and potential animal damage. Recent research (Emmingham et al. 2000; Hayes et al. 1996) on conversions concluded that they are usually only successful with an “aggressive approach, they are lengthy and costly", and that the long-term consequences are still unknown.

The effects of conifer thinning on tree growth have been well-documented for decades, methods for conifer thinning to enhance structural development and habitat characteristics have been developed over the last decade (Carey and Robert 1996; Barbour et al. 1997; Hayes et al. 1997; Tappeiner et al. 1997; Acker et al. 1998; Bailey and Tappeiner 1998), and recent research (Chan et al. 2004 (a), Chan et al. 2004 (b), Olson et al. 2002) has focused on the effects of conifer thinning on riparian microclimate and habitat. Conifer thinning not only provides more certainty that the long-term goal of the Fully Functional stage will be reached, but it also helps ensure that the ecological risk to salmonid habitat is greatly reduced. Hardwood conversion outside the 25-foot no-harvest inner zone has a significant temporary impact on the principal functions of RMZs. Conversions generally decrease that amount of shade and therefore may increase water temperatures. They also decrease the detrital input and input of large wood into the stream. When conversions are successful, they are expected to off-set the short term impacts through their ability to provide long-term improved functions such as long-lasting conifer down wood, more shade and improved stream bank stability. Since the long-term consequences of hardwood conversion on salmonid habitat are still unknown, the RFRS assigned conversions the lowest priority. As a result, it can be anticipated that the potential of negative short-term impacts to salmonid habitat quality will be reduced under the RFRS, in comparison to the priorities anticipated when the HCP was signed in 1997.

Finally, it is the intention of the DNR that restoration activities (i.e., thinning and hardwood conversion activities) will be applied to no more than approximately one percent of the west-side riparian management zones annually (excluding the OESF).

Specific Methods for Riparian Restoration

The HCP did not prescribe the specific methods to be used to achieve the goals of riparian restoration. It did direct DNR to develop implementation procedures for making site-specific forest management decisions in RMZs and wind buffers (WA DNR 1997, IV. 61) and it stated that "[s]ilvicultural practices that might be appropriate for riparian management zones may include precommercial thinning, commercial thinning, partial cuts, single tree selection harvesting, and stand conversion." (WA DNR 1997, IV. 208). The DEIS of the HCP envisions single-tree selective harvest and ecosystem restoration in the "minimal harvest" area (DEIS 4-153, 4-162) but does not list any other specific silvicultural tools that may be appropriate especially in the "low harvest" area.

The RFRS relies on the direction provided in the HCP and specifies that: "Silvicultural tools used will include individual tree selection, thinning, group selection (small canopy gaps), DWD and snag creation, and patch cuts (small conversions) in hardwood-dominated stands" (WA DNR 2005, page 23). The silvicultural tools described in the RFRS have all been shown to accelerate the development of stands towards older forest conditions and include the active creation of forest structures such as large diameter snags and large down wood typically found in later stages of stand development. Where the HCP mostly envisioned “retaining large trees and snags necessary to support viable populations of riparian wildlife and recruit future snags, coarse woody debris, and large woody debris” (WA DNR 1997, IV. 61), prescriptions in the RFRS provide for natural development of these structures but also for the artificial creation of some structure to “jump start” the development of late successional forest characteristics. Specifically, in the commercial thinning prescriptions in conifer-dominated stands, the RFRS requires the creation of five down trees per acre or a combination of down trees and snags equaling five trees per acre.

The RFRS adds further detail to the HCP by going on to specify the objectives, the prescription process, management sideboards not to be exceeded post-treatment, and an evaluation process for each major type of riparian management situation expected to be encountered (see WA DNR 2005, pages 25-33). This process provides the necessary structure so that field foresters will develop prescriptions that meet the intended goal of riparian restoration where it is needed and with the least negative impact.
Silvicultural tools described in the RFRS are within the range of silvicultural tools envisioned in the HCP to achieve the conservation objectives. The additional details provided by the RFRS are in accordance with the HCP requirement for the implementation procedures to define terminology, activities, and prescriptions, such as the distance between removed trees and the number of years between entries. (WA DNR 1997, IV. 61).

Management Zones and Management Intensity within the RMZ

The overall objective of RMZs, as mentioned earlier, is to ensure a properly functioning riparian ecosystem. The HCP EIS lists these functions as cool, clean water, stable stream banks, and short- and long-term large woody debris (LWD) recruitment to the aquatic environment (WA DNR 1996, 4-145). Two variables are influential in achieving the overall objective. The size of the buffers along streams –the width of RMZs– and the management intensity within the RMZs. The HCP established the overall RMZ width, and the implementation procedures for the RFRS do not make any overall width changes. The width of the RMZs was mostly driven by the potential of trees providing LWD to the stream “because of the fundamental role it [the LWD] plays in aquatic ecosystems” (WA DNR 1997, IV.70). As trees grow larger and taller over time, trees from greater distances can be recruited into the stream as LWD. Therefore, the width of riparian buffers was based on the potential tree height at age 100 at a given site and would range from 100 to 215 feet with an average of 150 to 160 feet. To protect the integrity and longevity of riparian buffers, additional wind buffers (50 to 100 feet in width) apply in certain circumstances along fish-bearing streams.

The RFRS’s role is to direct, within the given width of RMZs as defined by the HCP, the management intensity on a site-specific basis that would obtain the goal of salmonid habitat restoration. The following section explains the role of zones and management sideboards in determining the allowable forest management intensity to achieve the objectives for riparian restoration.

<u>Management Zones</u>

The HCP envisioned that RMZs are divided into three zones with the intent of decreasing management activity in zones closer to the stream channel. A minimum 25-foot "no-harvest" (inner) zone was established to protect stream bank stability, with an adjacent 75-foot (middle) zone of "minimal harvest" to protect important riparian functions such as stream shading, sediment interception and LWD delivery. Since most LWD (90% or more) is recruited from the first 100 feet, "minimal harvest" was intended to ensure minimal impact on the supply of short-term LWD. The remaining portion from 100 feet from the stream channel to the edge of the RMZ was referred to as the "low harvest" (outer) zone. The outer zone was intended to provide various functions, such as contributing some LWD, intercepting sediment on steep slopes, providing shade in some places and mitigating microclimate changes from potential upland forest management activities (WA DNR 1997, IV. 74). On fish bearing streams (type 1-3 waters), additional wind buffers apply beyond "normal" RMZ boundaries in areas prone to windthrow to "protect the interior riparian habitat components" (WA DNR 1996, 4-157).

The RFRS takes a slightly different approach to achieve the overall goal of maintaining or restoring salmonid freshwater habitat. The RFRS maintains a 25-foot "no-harvest" inner zone to provide stream bank stability, shade and LWD. It combines, however, the two subsequent zones of "minimal" and "low" harvest into one 75- to 200-foot zone (from the outer edge of the "no-harvest" inner zone to the 100-year site potential tree height) with the objective to accelerate stand development towards "older conifer forest" conditions (defined as the Fully Functional development stage in the RFRS). If the stream type and conditions require a wind buffer, it will also be added to the combined zone and could potentially lead to RMZ buffers of up to 300 feet (600 feet counting both sides of the stream) with a single set of objectives. In addition to the objective of accelerating the development of the riparian forest towards older forest conditions, the RFRS adopted the intent of the "minimal harvest" zone for the entire RMZ and the wind buffers, which is to "not appreciably reduce stream shading, the ability of the buffer to intercept sediment, or the capacity of the buffer to contribute detrital nutrients and large woody debris" (WA DNR 1997, IV. 60).

Since the goal of accelerating the development of an older forest condition and maintaining some of the functions at current levels can not be maximized together, the RFRS strikes a balance between the objectives and mitigates the potential short-term adverse impacts. Mainly, forest management activities designed to accelerate older forest conditions will remove trees that could potentially serve as large down wood. To achieve both the objective of accelerating development and preserving or minimizing the loss of LWD, prescriptions in the RFRS require the contribution of LWD to the stream at a density of five trees per acre when thinning conifer-dominated stands. Trees dying naturally in the riparian area usually deteriorate before falling to the ground, are from the smallest and most suppressed crown class, and have a low probability of reaching the stream channel. This mitigation measure adds larger, sound conifer down wood to the stream since the RFRS requires that trees be felled towards the stream from the first 25 feet outside the inner zone (where feasible). Trees dying due to natural mortality may fall in any direction and therefore do not have a great likelihood of serving as LWD in the stream even if they had the potential to reach the stream (for example, the maximum probability for a tree to fall into the stream is 50% for a tree growing right next to the stream; the probability decreases rapidly with increasing distance from the stream (Robinson and Beschta 1990)). Other mitigation measures prescribed in the RFRS to meet the intent of the "minimal harvest" zone include:

- A minimum number of trees, or a minimum stand density must be maintained post-treatment, whichever is greater. Recent research (Chan et al. 2004 (a); Chan, personal communication) shows that these minimum retention levels are well within the range of densities that do not impact stream temperature when thinning riparian conifer stands. Residual densities would also meet or exceed "total stream shading of 50-75 percent" for type 1, 2, and 3 waters to maintain water quality standards (WA DNR 1996, 4-160).
- The largest trees will be retained and large snags (>20" DBH) or accumulations of smaller snags will be protected, to provide for present and future large snags, down wood and LWD (WA DNR 2005, page 14).
- The inner "no-harvest" zone will be expanded where necessary to provide for shade, or to protect unstable or sensitive sites (WA DNR 2005, page 23).
- A 25-foot equipment "no-entry" zone adjacent to the inner zone is required to minimize disturbance to the ground vegetation and soils within 50 feet of the stream to minimize the potential for sediment delivery (WA DNR 2005, page 37).
- All skid trails will be water barred to minimize the potential for sediment delivery (WA DNR 2005, page 37).
- Riparian associated wetlands, which are important sediment filters (WA DNR 1996, 4-165), will be protected and will not be subject to thinning (WA DNR 2005, page 37).

Although the approach to combine the "minimal" and "low" harvest zones diverges from the HCP's vision of riparian management, the RFRS approach meets the objectives of riparian restoration as described in the HCP. Moreover, the RFRS is not likely to have a greater potential for negative impacts on riparian functions than that analyzed in the HCP DEIS because it adopts the intent of the "minimal harvest" zone for the entire RMZ and wind buffer. By developing one set of objectives for the portion of the RMZ outside the inner zone, forest managers will likely be more successful at implementing effective restoration. Combining the two zones and managing them together for a long-term goal of the Fully Functional forest development stage is low risk and provides the operational basis for DNR field staff to conduct feasible and economically viable restoration activities within 100 feet of a stream. If the middle and outer zone would have to be managed separately, the feasibility of implementing any active restoration would be greatly diminished and the restoration of high quality salmonid habitat would be delayed by decades in most instances. Most importantly, management under the RFRS will provide as much riparian function, if not more, in the 25-100-foot area from streams, particularly in the future, as the treated stands are put on the trajectory towards a fully functioning condition.

Management Intensity

The most important variable in defining how the objectives of habitat restoration can be achieved, given the RMZ width determined by the HCP, is the actual management intensity in the RMZ in the combined zone (outside the 25-foot no harvest zone) and the wind buffers where applicable. As pointed out, the HCP made reference to “minimal” and “low” harvest areas to be further defined by the RFRS, and described some of the silvicultural tools to be used. By defining the Fully Functional forest development stage as the long-term objective and by targeting to minimize impacts to current levels of riparian functioning as described for the “minimal harvest” zone, the RFRS relied on the Scientific Committee Recommendations, research from the OESF, scientific literature and experience of DNR staff to develop management “sideboards” for riparian forest management prescriptions. These sideboards, when applying the range of acceptable silvicultural tools, are in place to ensure impacts to riparian functions are minimized in the short-term while they clearly accelerate the development of the riparian forest towards the goal of the riparian desired future condition, the intermediate benchmark towards the Fully Functional development stage. Restoration is, therefore, only acceptable when it can be clearly demonstrated that active management is superior to passive management while avoiding adverse impacts to current riparian functions.

Reviews from stakeholders indicated that the proposed sideboards would potentially allow too many trees to be harvested and too few left to die naturally and serve as LWD. As a consequence, the number of residual trees was adjusted to even surpass the levels suggested by the Scientific Committee for the “minimal harvest” area. Adjustments were also made to ensure that deliberate down wood contributions would mostly benefit salmonid species rather than other riparian obligate species. Nevertheless, some stakeholder concern remains about thinning intensities. DNR believes that the management sideboards are appropriate and adequate to protect riparian functions for several reasons:

- Literature (Tappeiner et al. 1997; Bailey and Tappeiner 1998) on older forest development and the Science Committee Report suggest more aggressive thinning to be appropriate. The current sideboards have been shown not to impact stream shading and stream temperature (Chan et al 2004 a) and therefore represent an acceptable trade-off between accelerating structural forest development and maintaining important functions.
- A review of current literature has not substantiated that the proposed thinning levels will have significant adverse impact on LWD levels and therefore salmonid habitat. Most input of down wood appears to occur through landslides, bank undercutting, flooding and windthrow (Hairston-Strang and Adams 1998; May and Gresswell 2003) and catastrophic disturbance plays a major role in LWD recruitment (Bragg 2000). Most input of LWD in the early forest development stages comes from hardwoods (Sedell et al. 1988, Beechie et al. 2000), which generally do not last long as LWD (unless consistently submerged under water (Bilby et al. 1999)).
- Reductions in overall LWD levels will be mitigated through the contribution of artificially created LWD, which will better meet the functions of LWD than would be provided through a natural process of suppression mortality (death

through competition for light, water, nutrients and physical space). The LWD will be larger in size, from conifer species and directly felled towards the stream. Active management may result in some windthrow, further potentially contributing LWD to the stream.

- LWD source distance increases with the height of the trees in the adjacent riparian forest. Since most riparian thinning will take place in relatively young stands (and therefore with shorter trees), a large percentage (>50%) of natural LWD input will come from a short distance, mostly, the "no-harvest" inner zone, which will not be thinned (Meleason et al. 2003, Meleason et al. 2002).
- The "no-harvest" inner zone will be expanded beyond 25 feet to protect unstable slopes, wetlands, and other sensitive sites or when riparian functions are not adequately provided (i.e. due to few trees, little shading may be provided in the first 25 feet) (WA DNR 2005, page 23).
- Riparian restoration treatments make interventions in dynamic ecosystems. Riparian management prioritizes the treatment of young conifer stands. These stands respond extremely fast to management activities, returning to pre-treatment levels often within a decade or less. Therefore, the mitigation measures, in particular LWD placement, will not only bridge the time until higher quality LWD becomes available naturally but last many years longer.
- Comparing natural levels of LWD recruitment with the required contributions in the RFRS during restoration treatments is a top priority in the list of adaptive management research projects (WA DNR 2005, page 44).

The minimum management sideboards outlined in the RFRS are not management targets. Forest managers will make decisions about thinning prescriptions based on many factors such as species, existing density, access, and windthrow. These minimum sideboards will often not be appropriate for the site. Windthrow poses a particular risk to the riparian ecosystem because it influences the future (long-term) potential LWD source, may increase sediment delivery through upturned root wads and negatively impact interior riparian habitat components. Each management scenario therefore includes an assessment of windthrow risk and the management sideboards contain specific guidelines for minimizing it. The concern expressed in the DEIS (WA DNR 1996, 4-148) in regards to windthrow in riparian buffers adjacent to upland harvests was specifically addressed in the RFRS with a separate management scenario. Trained field staff in riparian restoration will be available in each region to assist in developing appropriate management prescriptions including considerations for windthrow.

Another stakeholder concern that has been raised is that the mitigation measure of five trees per acre as LWD or a combination of LWD and snags was not site-specific and thus not following the direction of the HCP to develop site specific-prescriptions. The DEIS, however, states that "LWD loading rates can vary widely between and within drainages of similar size, gradient, and logging history" (WA DNR 1996, 4-152). Several more recent studies support this finding (Acker et al. 2003, Lisle 2002). It is therefore almost impossible to prescribe more site-specific guidance on LWD contributions to streams. The proposal of five trees per acre (one LWD piece approximately every 40 feet) is anticipated to exceed most natural contributions for the intended time frame (one to three decades depending on age and thinning intensity). This issue is of the highest research priority and changes may be made in the future through the adaptive management process.

In summary, protection of riparian functions is mainly a function of RMZ width and to a lesser degree of management intensity. The RFRS meets the objectives of the HCP's middle "minimal harvest" zone to "not appreciably reduce stream shading, the ability of the buffer to intercept sediment, or the capacity of the buffer to contribute detrital nutrients and large woody debris" in the entire RMZ, including the wind buffer through its establishment of management sideboards and required mitigation measures. Therefore, neither the combining of zones nor the potential allowable management intensity will have greater impacts than those analyzed in the HCP FEIS. The proposed management in the RFRS will meet the DEIS requirement that the "riparian management zone that is left after harvest activity should be of sufficient width and condition to maintain the integrity of the riparian ecosystem" (WA DNR 1996, 4-147). Recent findings from a thinning study of riparian forests in northwest Oregon support this notion and show that "differing residual thinning densities and different buffer widths result in relatively small changes in the riparian environment, and that these changes are not associated with detectable decreases in riparian-dependent organisms (Chan et al. 2004 b)".

These implementation procedures can be seen as very conservative. Measures have been taken to minimize and mitigate for any minor, short-term adverse impacts and to monitor these impacts. If these impacts exceed expected levels, they will be addressed through the RFRS Adaptive Management process explained below. As forests are created with larger trees and more structural diversity decades earlier than if left unmanaged, the long-term benefits of improved salmonid habitat quality will be realized much sooner and will balance potential insignificant, short-term reductions in some ecosystem functions. This was the HCP's intent.

Adaptive Management

Adaptive management is an integral part of the HCP and the RFRS. It "provides for ongoing modifications of management practices to respond to new information and scientific developments" (WA DNR 1997, B10). "*Adaptive management changes consistent with the restoration goal will be made to this Riparian Forest Restoration Strategy when implementation and/or effectiveness monitoring indicate that the objectives outlined in the RFRS and the HCP Conservation Strategy are not being met. It is anticipated that applied research led by DNR and others, could result in innovations that will increase the ability of the department to implement the strategy with higher efficiency and less potential of short-term adverse habitat impacts*" (WA DNR 2005, page 44).

The HCP proposed a 10-year adaptive management phase to refine management activities within RMZs. Since it has taken seven years to develop the implementation rocedures and since DNR anticipates that new, valuable information will become available over time, the adaptive management process as outlined in the HCP's Implementation Agreement will be used in RMZ management during the entire term of the Habitat Conservation Plan. Table 6 in the RFRS (page 44) provides an initial list of research topics for adaptive management including their priorities. Two of the most important adaptive management research topics are the evaluation of windthrow associated with the RFRS management prescriptions and the effectiveness of artificial LWD input to mitigate the potential loss of LWD through thinning. Some of the adaptive management topics, such as windthrow associated with the RFRS prescriptions, can be addressed through implementation monitoring, which will provide immediate results following implementation of the RFRS. Other topics will have to be evaluated through effectiveness monitoring, which will take several years to provide adaptive management guidance.

Cumulative Effects of RFRS Implementation

Cumulative effects are the effects that result from "incremental impact of the action when added to other past, present, and reasonable foreseeable future actions" (WA DNR 1996 DEIS, 4-535). The effects can be individually minor, but collectively significant. The HCP's DEIS points out that the goal of seeking overall riparian ecosystem function "should provide greater certainty of positive cumulative effects for the high number of species that rely on riparian, wetland, and aquatic areas than the No Action alternatives" (WA DNR 1996, 4-538). The DEIS goes on to mention that the Riparian Conservation Strategy "provides greater certainty that the range of successional stages on DNR-managed lands will include older forests, with important unique features and habitats maintained (…)".

The RFRS, defines the Fully Functional forest development stage as the long-term restoration goal for approximately 270,000 acres of Westside riparian buffers on state trust lands. Less than 2% of all RMZ acres currently meet this objective, and less than 25% of all RMZ acres are estimated to be currently on a trajectory to meet this goal without active forest management. Therefore, the RFRS can make a large positive contribution towards accelerating the development of late successional riparian forest characteristics on approximately 70% of RMZ acres, which in turn provide high quality salmonid habitat. The HCP also anticipates that "spotted owl habitat and marbled murrelet habitat can be developed faster with the application of these practices in riparian management zones" (WA DNR 1997, IV 208). Based on these statements and current available science, it can be safely assumed that the long-term impact of the RFRS will result in positive beneficial effects for salmonid and other threatened and endangered species.

The main question is whether the RFRS has the potential to cause any short-term adverse cumulative impacts to salmonid habitat. This appears unlikely for several reasons. First, the RFRS has to be viewed in the context of the other four components of the Riparian Conservation Strategy. As discussed earlier, sediment delivery, for example, is largely a result of the Road Management Strategy and application of Hydrologic Maturity. The RFRS tries to provide for operational efficiency and flexibility to minimize road construction and accelerate road abandonment, but can only be successful in combination with the other components.

Secondly, the RFRS determines the acceptable levels of management intensity within the RMZ to reach site-specific objectives, while the main factor in determining the minimization of adverse cumulative effects, the buffer width, has already been determined by the HCP with that intent in mind. Based on the fact that the management intensity is guided by the premise of meeting the objectives of the “minimal harvest” zone for the entire RMZ and wind buffers, potential adverse impacts must be considered to have less impacts than those analyzed in the HCP FEIS (which proposed more harvest in the outer zone and the wind buffer).

Thirdly, several factors will guide riparian restoration in such a way that the potential for cumulative adverse impacts will be reduced at a watershed level: Restoration activities will be conducted in synchrony with upland activities, which are spatially and temporarily separated; riparian stands can only receive two commercial restoration treatments to put them on trajectory towards the Fully Functional forest stage unless a third one is specifically authorized by the federal services; and DNR will follow guidance by the Incidental Take Permit (NOAA 1999), which estimated that “annual impacts from near riparian forest activities is calculated to be about 1% of the total riparian area”, which would translate into approximately 2,700 acres annually for all Westside planning units excluding the OESF.

Additionally, each individual restoration project, as a part of an upland timber harvest, will most likely undergo the SEPA review process, which will include a case-by-case assessment of environmental impacts and the potential for adverse cumulative effects.

In general, the HCP and the RFRS implementation procedures address cumulative effects by establishing minimum standards for riparian forest restoration. A number of additional Forest Practice Regulations in the State of Washington address cumulative effects including road maintenance and abandonment plans, harvest unit size and separation requirements, and other protections (see WAC 222.). Adaptive management, as part of the HCP and RFRS will also, over time, reduce the potential for adverse cumulative impacts.

The cumulative effects of implementing the Riparian Conservation Strategy, as described in the RFRS, will result in a net gain in the ecological health and viability of riparian habitats that benefit salmonids and other riparian-obligate species on state forest trust lands in Western Washington. In combination, the HCP, and the more detailed active RMZ restoration elaborated in the RFRS, together with the broader Forest Practice Rules, “reflect a significant widespread positive effort and financial commitment to improve water quality, put listed species on a positive trend towards recovery, and provide substantial protection for other aquatic and riparian-associated species” (WA DNR 2001 3-215).

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Attachment B

PROCEDURE **Department of Natural Resources**

Date: **September 2005**

Cancels: PR 14-004-150 IDENTIFYING AND PROTECTING RIPARIAN AND WETLAND MANAGEMENT ZONES IN THE WEST-SIDE HCP PLANNING UNITS, EXCLUDING THE OESF PLANNING UNIT (August 1999). Effective immediately

PR 14-004-150 IMPLEMENTATION PROCEDURES FOR THE HABITAT CONSERVATION PLAN RIPARIAN FOREST RESTORATION STRATEGY

APPLICATION West-side HCP Planning Units, Excluding the OESF Planning Unit

DISCUSSION

The riparian strategy for west-side planning units, excluding the OESF, has a two-fold objective of: (1) maintaining or restoring freshwater habitat for salmonid species; and (2) contributing to the conservation of other species that are dependent upon aquatic and riparian areas. This is accomplished by identifying riparian and wetland areas and ensuring that management activities within those areas adequately protect riparian function.

Riparian function can be viewed from both societal and ecological perspectives. From a societal perspective, riparian function includes the production of commodities and other services for human benefit. Salmon, wildlife, and timber are examples of the commodities produced by riparian ecosystems. The delivery of high quality water, flood control, and recreation is an example of services provided by riparian ecosystems. From an ecological perspective, riparian function can be viewed as providing habitat for numerous plant and animal species including clean water, shade, large woody debris and detrital nutrients for salmon habitat, damp soil and logs for terrestrial amphibian habitat, snags for cavity nesting birds, etc.

The Implementation Procedures for the Riparian Forest Restoration Strategy will be followed to identify and manage riparian and wetland zones. The riparian management zone consists of a managed riparian buffer and, where appropriate, a wind buffer to protect the integrity of the managed riparian buffer. The riparian buffer has been designed to maintain/restore riparian processes that influence the quality of salmonid freshwater habitat and to contribute to the conservation of other aquatic and riparian obligate species. Consideration has been given to water temperature, stream bank integrity, sediment and detrital nutrient load, and large woody debris.

Action

1. The first step in implementing the Riparian Forest Restoration Strategy is to verify the accuracy of water-type information for all waters currently designated as Type 4 or 5 that are located within the boundary of the proposed activity. Among others, either or both of the following two methods may be used:

a. Water type information may be verified through consultation with fisheries biologists from DNR, tribes, or other agencies.

b. Water type information may be verified by certified and/or trained personnel using the protocol specified in WAC 222-16-030, Washington Forest Practices Board Emergency Rules (stream typing), November 1996 and the Forest Practices Board Manual.

This stream typing system will now be officially referenced as the "Trust Forestland HCP Water Typing System". The "Trust Forestland HCP Water Typing System" complete provisions are in the table below:

Type 1	Type 1 Water means all waters, within their ordinary high-water mark, as inventoried as "shorelines of the state" under chapter 90.58 RCW and the rules promulgated pursuant to chapter 90.58 RCW, but not including those waters' associated wetlands as defined in chapter 90.58 RCW.
Type 2	Type 2 Water shall mean segments of natural waters that are not classified as Type 1 Water and have a high fish, wildlife, or human use. These are segments of natural waters and periodically inundated areas of their associated wetlands, which: (a) Are diverted for domestic use by more than 100 residential or camping units or by a public accommodation facility licensed to serve more than 100 persons, where such diversion is determined by the department to be a valid appropriation of water and the only practical water source for such users. Such waters shall be considered to be Type 2 Water upstream from the point of such diversion for 1,500 feet or until the drainage area is reduced by 50 percent, whichever is less; (b) Are diverted for use by federal, state, tribal or private fish hatcheries. Such waters shall be considered Type 2 Water upstream from the point of diversion for 1,500 feet including tributaries if highly significant for protection of downstream water quality. The department may allow additional harvest beyond the requirements of Type 2 Water designation provided the department determines after a landowner-requested on-site assessment by the department of fish and wildlife, department of ecology, the affected tribes and the interested parties that: (i) The management practices proposed by the landowner will adequately protect water quality for the fish hatchery; and (ii) Such additional harvest meets the requirements of the water type designation that would apply in the absence of the hatchery; (c) Are within a federal, state, local, or private campground having more than 30

	camping units: *Provided*, That the water shall not be considered to enter a campground until it reaches the boundary of the park lands available for public use and comes within 100 feet of a camping unit, trail or other park improvement; (d) Are used by substantial numbers of anadromous or resident game fish for spawning, rearing or migration. Waters having the following characteristics are presumed to have highly significant fish populations: (i) Stream segments having a defined channel 20 feet or greater in width between the ordinary high-water marks and having a gradient of less than 4 percent. (ii) Lakes, ponds, or impoundments having a surface area of 1 acre or greater at seasonal low water. (e) Are used by salmonids for off-channel habitat. These areas are critical to the maintenance of optimum survival of juvenile salmonids. This habitat shall be identified based on the following criteria: (i) The site must be connected to a stream bearing salmonids and accessible during some period of the year; and (ii) The off-channel water must be accessible to juvenile salmonids through a drainage with less than a 5% gradient.
Type 3	Type 3 Water shall mean segments of natural waters that are not classified as Type 1 or 2 Water and have a moderate to slight fish, wildlife, and human use. These are segments of natural waters and periodically inundated areas of their associated wetlands which: (a) Are diverted for domestic use by more than 10 residential or camping units or by a public accommodation facility licensed to serve more than 10 persons, which such diversion is determined by the department to be a valid appropriation of water and the only practical water source for such users. Such waters shall be considered to be Type 3 Water upstream from the point of diversion for 1,500 feet or until the drainage area is reduced by 50 percent, whichever is less; (b) Are used by significant numbers of anadromous or resident game fish for spawning, rearing or migration. Guidelines for determining fish use for the purpose of typing waters are described in Appendix 3. If fish use has not been determined: (i) Waters having the following characteristics are presumed to have significant anadromous or resident game fish use: (A) Stream segments having a defined channel of 2 feet or greater in width between the ordinary high-water marks in Western Washington and having a gradient 16 percent or less; (B) Stream segments having a defined channel of 2 feet or greater in width between the ordinary high-water marks in Western Washington and having a gradient greater than 16 percent and less than or equal to 20 percent; and having greater than 50 acres in contributing basin size in Western Washington; (ii) The department shall waive or modify the characteristics in (i) above where: (A)Waters are confirmed, long term, naturally occurring water quality parameters incapable of supporting anadromous or resident game fish;

	(B) Snowmelt streams have short flow cycles that do not support successful life history phases of anadromous or resident game fish. These streams typically have no flow in the winter months and discontinue flow by June 1; or (C) Sufficient information about a geographic region is available to support a departure from the characteristics in (i), as determined in consultation with the department of fish and wildlife, department of ecology, affected tribes and interested parties. (iii) Ponds or impoundments having a surface area of less than 1 acre at seasonal low water and having an outlet to an anadromous fish stream. (iv) For resident game fish ponds or impoundments having a surface are greater than 0.5 acre at seasonal low water. (c) Are highly significant for protection of downstream water quality. Tributaries which contribute greater than 20 percent of the flow to a Type 1 or 2 Water are presumed to be significant for 1,500 feet from their confluence with the Type 1 or 2 Water or until their drainage area is less than 50 percent of their drainage area at the point of confluence, whichever is less.
Type 4	Type 4 Water classification shall be applied to segments of natural waters which are not classified as Type 1, 2 or 3, and for the purpose of protecting water quality downstream are classified as Type 4 Water upstream until the channel width becomes less than 2 feet in width between the ordinary high-water marks. Their significance lies in their influence on water quality downstream in Type 1, 2, and 3 Waters. These may be perennial or intermittent.
Type 5	Type 5 Water classification shall be applied to all natural waters not classified as Type 1, 2, 3, or 4; including streams with or without well-defined channels, areas of perennial or intermittent seepage, ponds, natural sinks and drainage ways having short periods of spring or storm runoff.

2. After verification of water type information, or the decision to manage Type 4 or 5 waters as Type 3, Step 2 in implementing the Implementation Procedures for the RFRS is to determine the boundary of the riparian management zones for the proposed activity. This step has three parts. First, the 100-year flood plain must be identified for all Types 1, 2, 3, and 4 waters; it is from the outer edge of this area that the riparian buffer is measured. Second, the appropriate riparian buffer must be identified. Third, the need for a wind buffer must be evaluated and, if needed, located.

a. Identify the 100-year flood plain for each Type 1, 2, 3, and 4 water. Among others, any, or a combination, of the following methods may be used:

i. Identify the 100-year flood plain using information from FEMA (Federal Emergency Management Agency) or flood insurance rate maps.

ii. Identify the 100-year flood plain. One method that may be used is the following field location method, a modification of the information contained in the Forest Practices Board manual's The Standard Methods for Measuring Physical

Parameters of a Stream (dated 7/95). Using this method, averages for stream reaches may be determined by:

A. Establish the ordinary high water mark (OHWM) using vegetation or historical evidence.

B. Divide the OHWM channel width into at least 4 equal sections.

C. At the edge of each section, measure the depth from the elevation of the OHWM to the stream bottom.

D. Calculate the average depth by adding all of the depths measured in C. above together, then dividing the total by the number of measurements.

E. Calculate the 100-year flood plain elevation by adding the value calculated in D. above for the average depth to the elevation of the OHWM (doubles the average channel depth).

F. Field-locate the intersection of the 100-year flood plain with each side of the channel bank using hand levels and level rods, or clinometers and measuring tapes,

OR

By calculating the distance from the OHWM to the 100-year flood-level intersection using ground slope measurements taken in the field. (Example: For a channel with bank slopes of 10% on each side and an average depth to OHWM of 1.2 feet, the distance is equal to rise over run, so divide 1.2 feet by .10 to yield a horizontal distance of 12 feet from the OHWM to the 100-year flood plain.

b. Next, identify and measure the riparian buffer, using horizontal distance, from the outer edge of the 100-year flood plain or the boundary of the wetland (wetlands identified using the Forest Practices Board manual's Guidelines for Wetland Delineation, dated 6/93). The appropriate buffer width is dependent upon water type for streams, size for wetlands, and the site index of conifer stands one would expect to develop in the area.

i. For Type 1, 2, and 3 waters, and for all wetlands that are greater than 1 acre in size, the average width of the riparian buffer will be equal to or greater than the average height an adjoining conifer stand would be expected to reach at 100 years of age (using site index, which may be determined by using one or more of the following methods: State Soil Survey data, Forest Resource Inventory System data (FRIS), on-site calculation from fixed or variable plots taken every 660 feet on a transect that parallels the stream with at least two dominant conifer trees per plot measured and site calculated using site table, or DNR Intensive Management Planning System (DNRIMPS) or other appropriate growth-and-yield model).

Regardless of site index, the average width of the buffer will be no less than 100 feet.

ii. For Type 4 waters, and for all wetlands between 0.25 and 1 acre in size, the width of the riparian buffer will be 100 feet.

c. The final step in identifying the riparian management zone is to evaluate the need and, if needed, the appropriate width and location for wind buffers to protect the integrity of the riparian management zone.

i. Determine if at least a moderate risk of windthrow exists for all Type 1 and 2 waters, and for Type 3 waters equal to or greater than 5-feet wide. Moderate is defined as 45 percent or more blowdown after 5 years and is determined using local knowledge, the Buffer Strip Survival Rate Worksheet (from Steinblums, Froehlich, and Lyons, Designing Stable Buffer Strips For Stream Protection), or other model approved by the State Lands Assistant. Where at least a moderate risk exists, apply a 100-foot (horizontal distance) wind buffer on Type 1and 2 waters, and a 50-foot wind buffer on Type 3 streams greater than 5-feet wide. The buffer shall be located on the windward side of the stream.

ii. Type 3 waters less than 5 feet wide, and Type 4 and 5 waters will not have a wind buffer. Wetlands will not receive a wind buffer, except for those that meet the description of "off-channel habitat" as discussed in WAC 222-16-030 (dated 6/93), page 16-10 under (2) "Type 2 Water," which will be treated as Type 2 waters.

3. Once the riparian management zone, and wetlands and their associated buffers, has been identified, proposed management activities will be evaluated based on Section 2 of the Implementation Procedures for the Habitat Conservation Plan Riparian Forest Restoration Strategy, attached.

End Procedure

APPROVED BY: Gretchen Nicholas

Gretchen Nicholas
Division Manager, Land Management Division

DATE: April 20, 2006

SEE ALSO:

DNR Habitat Conservation Plan, 1997

Implementation Procedures for the Habitat Conservation Plan Riparian Forest Restoration Strategy (August 2005)

Attachment C

United States Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
United States Department of the Interior
Fish and Wildlife Service

National Marine Fisheries Service
510 Desmond Drive SE., Suite 103
Lacey, Washington 98503

U.S. Fish and Wildlife Service
510 Desmond Drive S.E., Suite 102
Lacey, Washington 98503

August 15, 2005

R. Bruce Mackey
Lands Steward
Washington State Department of Natural Resources
PO Box 47000
Olympia, WA 98504-7000

Dear Mr. Mackey:

The U.S. Fish & Wildlife Service and NOAA's National Marine Fisheries Service (NOAA Fisheries) (together, the Services) are writing to inform you and other interested parties that our staff has reviewed the August 2005 version of the Implementation Procedures for the Riparian Forest Restoration Strategy (RFRS) and find it is consistent with the elements outlined in your Habitat Conservation Plan HCP (State Lands HCP, approved by the Services January 1997). These riparian Implementation Procedures fulfill the requirements outlined in the HCP (IV. 61) and provide the promised guidance for site specific riparian management while not changing any existing HCP conservation strategies. In our view, implementing these riparian procedures as described will not lead to an increased level of incidental take authorized by the Services in 1997, or lead to an appreciable reduction in riparian ecosystem functions.

As described in the HCP, the Implementation Procedures document has been prepared by Department of Natural Resources (DNR) staff in close collaboration with the Services. This August 2005 document addresses substantive concerns with previous versions raised by the Services, Northwest Indian Fisheries Commission (NWIFC) and others. Based on our review, we believe that the procedures will meet the HCP riparian objectives: 1) to maintain or restore salmonid freshwater habitat on DNR managed lands, and 2) contribute to the conservation of other aquatic and riparian obligate species (HCP IV. 55 - 79).

Invariably, questions of implementation will arise with these riparian Implementation Procedures that we cannot now foresee. In that instance, we expect to continue our constructive interagency dialog to find solutions that meet the intent of the procedures and HCP objectives. If DNR or the Services believe it is necessary, the Technical Review Committee consisting of scientists from the DNR, the Services, the NWIFC, and the Washington Department of Fish and Wildlife will be convened to address the implementation issue.

In addition, the Services will continue to fulfill their government-to-government role with western Washington Tribes on the implementation of this HCP.

The 2009 Compliance Monitoring Report, as described in the Implementation Procedures, will provide an early opportunity to diagnose implementation issues and allow the Technical Review Committee to adapt the procedures, if needed, based on the latest observations and information. We believe this three-year Implementation Period integrates well with the HCP adaptive management process to give us a high level of confidence in the effectiveness of HCP implementation of riparian areas.

The Services have worked closely with your staff to understand the details of the riparian Implementation Procedures and the DNR has been receptive to our suggestions. We agree with DNR that this document is important to guide HCP implementers as they develop the site-specific forest prescriptions to achieve the desired future conditions of ecologically functional forests along streams and wetlands. Based on our review of the RFRS, the Services believe the August 2005 version of the Implementation Procedures for the Riparian Forest Restoration Strategy is consistent with the intent and goals of the riparian conservation strategy described in the HCP.

We look forward to working with the DNR on implementing and monitoring the effectiveness of the riparian procedures. Thank you for your attention and your staff's commitment to ensure the HCP is effectively implemented. If you have questions about this letter, please contact Matthew.Longenbaugh@noaa.gov, (360) 753-7761, or Mark_Ostwald@FWS.gov, (360) 753-9564.

Sincerely,

Steven W. Landino
Washington State Director
for Habitat Conservation

Ken S. Berg
Ken S. Berg, Manager
Western Washington Fish and Wildlife
U.S. Fish and Wildlife Service

cc: Becky Kelley, WEC
Bruce Davies, NWIFC
Fran Wilsheusan, NWIFC
Steve McConnell, NWIFC
Tami Riepe, DNR
Gretchen Nicholas, DNR
Paula Swedeen, WDFW